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**ILLINOIS STATE POLICE  
AIR SPEED CHECK**

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**GEORGE H. RYAN, GOVERNOR**  
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Since November 1, 1959, the Illinois State Police has been conducting Air Speed Checks. In order to determine a motor vehicle's speed from an aircraft, a method of obtaining a time-distance relationship is required.

It is necessary that at least one of the variables involved remain constant. The logical choice is the distance measurement on the roadway itself, since it could be accurately measured and painted so that it would be readily identifiable from State Police aircraft. One-eighth mile (660 feet) was chosen since it had been previously tried and proven in at least one other state and appeared to be satisfactory for the highway system of the State of Illinois.

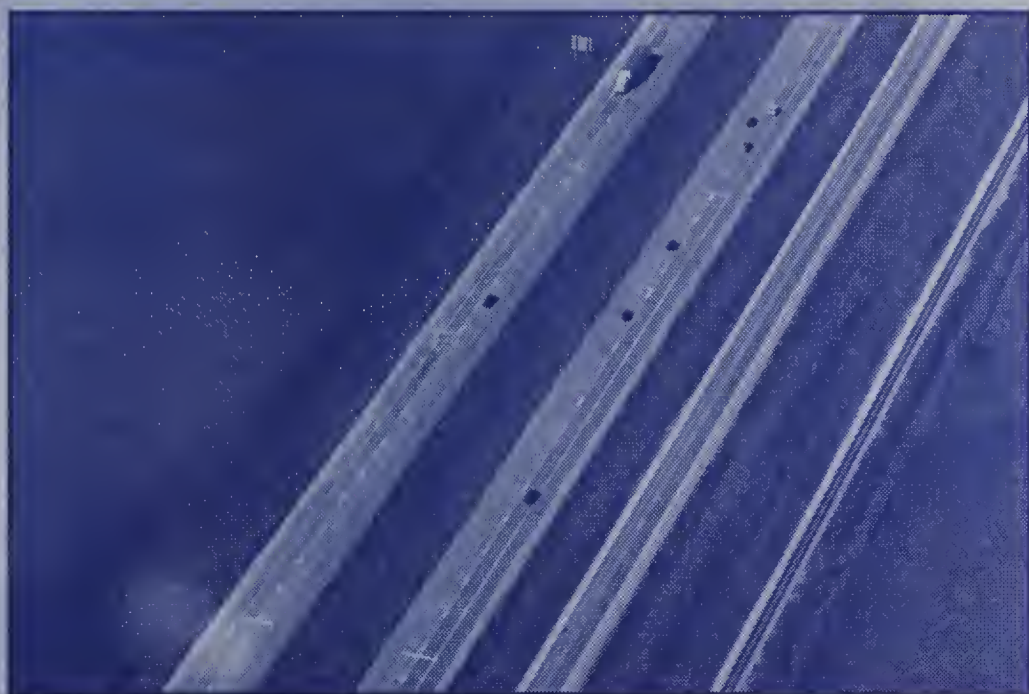
Since the distance remains constant, the time element is the variable in determining the average speed of the vehicle as it traverses the measured one-eighth mile distance. An electronic timer (stopwatch) is used to measure the time interval in seconds and tenths of a second that the vehicle used in traversing the 660 feet.

Example: If a vehicle took exactly five (5) seconds to traverse the measured 660 feet on the roadway, this variable (5.0 seconds) becomes the divisor. The dividend is the one-eighth mile constant (660 feet). The quotient of this arithmetic calculation is the average speed of the vehicle at the time it traversed the one-eighth mile course in feet per second, as follows:

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$$5.0 \text{ seconds} \left| \frac{132 \text{ ft. per sec.}}{660 \text{ feet}} \right.$$

In order to convert this speed into miles per hour, this figure must be multiplied by the number of seconds in an hour (3600 seconds) and the resulting figure divided by the number of feet in a mile (5280 feet), as follows:

$$\begin{array}{r}
 132 \text{ feet per second} \\
 \underline{3600 \text{ seconds in an hour}} \\
 79200 \\
 \underline{396} \\
 475200 \text{ feet per hour}
 \end{array}$$

$$\begin{array}{r}
 90.00 \text{ miles per hour} \\
 \underline{5280 \text{ feet in a mile}} \left| 475200 \text{ feet per hour} \right.
 \end{array}$$

The average speed of the vehicle traversing this measured distance in exactly five (5) seconds is 90.00 miles per hour.

## Conclusion:

Based on tests that have been conducted, the following conclusions can be made:

1. It is possible to calculate the average speeds of motor vehicles over a one-eighth mile distance from an observation plane with an average error of but one percent in miles per hour.
2. It is reasonable to assume that a vehicle speed calculated with a time and distance interval relationship, such as described, can determine actual average ground speed through an airspeed zone with maximum accuracy.

Partial time-speed relationship table as measured through a 660 foot course:

<b>Time (seconds)</b>	<b>Speed (m.p.h.)</b>
4.0	112.50
4.5	100.00
5.0	90.00
5.5	81.82
6.0	75.00
6.5	69.23
7.0	64.28
7.5	60.00
8.0	56.23
8.5	52.94
9.0	50.00

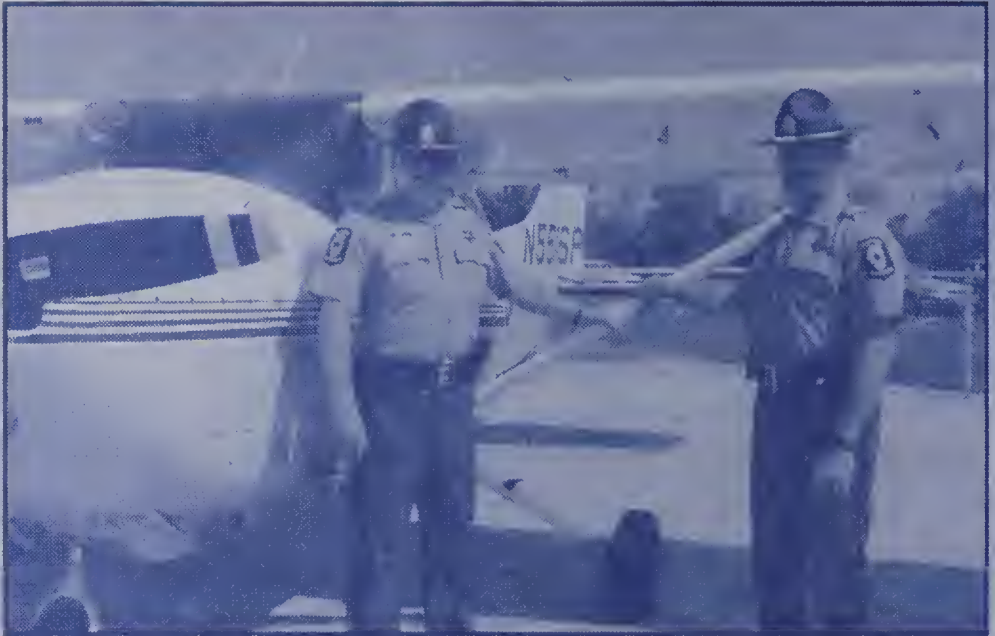
The Air Operations section operates a number of aircraft available to assist city, county, state and federal agencies in a variety of enforcement and non-enforcement activities. Sworn ISP officers are assigned as pilots to the sections in offices geographically dispersed throughout the state. The aircraft are used for a variety of details including air speed checks, manhunts, searches, surveillances, marijuana eradication, transportation, commercial vehicle enforcement programs and any other legitimate use requiring an aerial platform.

**For further information contact:  
Illinois State Police Air-Operations  
Section (217) 782-2206**

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